Patent Claims

What is claimed is:

1. A method of producing a polyamide nanocomposite from partially crystalline polyamides and organically modified layered silicates in a double screw extruder, a first part of the polyamides being dosed into the extruder intake and melted and the organically modified layered silicate being admixed with the melt of the polyamides and then a second part of the polyamides being added to the mixture,
characterized in that the resulting melt is subjected to filtration.

2. The method according to Claim 1,
characterized in that the filtration of the melt is performed directly before the extruder nozzle.

3. The method according to Claim 1,
characterized in that a melt filtration is performed during a separate extrusion procedure.

4. The method according to one of Claims 1 through 3,
characterized in that wire filters having a mesh width of at most 200 µm, preferably between 50 µm and 100 µm, are used to perform the melt filtration.

5. The method according to one of Claims 1 through 4,
characterized in that, with the addition of the organically modified layered silicate, a mixture ratio in the range of 60 to 80 weight-percent of polyamides and 40-20 weight-percent of layered silicates is produced and the second part of the polyamides is added to the mixture in the quantity necessary in order to achieve the final concentration of the layered silicates of at most 10 weight-percent in the melt of the polyamide nanocomposite.

6. The method according to Claim 5,

characterized in that, with the addition of the organically modified layered silicate, a mixture ratio of 70 weight-percent of polyamides and 30 weight-percent of layered silicates is produced and the second part of the polyamides is added to the mixture in the quantity necessary in order to achieve the final concentration of 2.5 to 6 weight-percent of the layered silicates in the melt of the polyamide nanocomposite.

7. The method according to one of the preceding claims, characterized in that the layered silicates are organically modified using phosphonium salts of the formula P-R_4-X, R_4 representing three alkyl or aryl residues and X being a Cl, Br, or I.

8. The method according to one of the preceding claims, characterized in that the exfoliated layered silicates have an ultrafine grain having an average particle size in at least one dimension of at most 100 nm.

9. The method according to one of the preceding claims, characterized in that the polyamides are selected from a group which includes the homopolyamides PA 6, PA 66, PA 46, as well as PA 11 and PA 12.

10. The method according to one of the preceding claims, characterized in that the partially crystalline polyamides are admixed with a component of amorphous polyamide.

11. The method according to one of the preceding claims, characterized in that the organically modified layered silicates include phyllosilicates of the three-layer type (2:1).

12. An injection-molded part, which is produced using a polyamide nanocomposite obtained according to the method according to one of the preceding claims,

characterized in that it has a surface which has an average roughness value (R_a) of less than 0.05 µm and/or has an average roughness depth (R_z) of less than 4 µm.

13. The injection-molded part according to Claim 12, characterized in that it includes a smooth surface having a high gloss produced by a molding tool polished to a high gloss.

14. A reflector for vehicle driving illuminators, characterized in that it includes an injection molded part according to Claim 12 or 13 and is metallized directly.

15. A reflector for signal or street lights and/or a sub-reflector for vehicle driving illuminators, characterized in that it includes an injection molded part according to Claim 12 or 13 and is metallized directly.

16. The reflector according to one of Claims 14 or 15, characterized in that the metal coating is applied through PVD methods.

17. The use of a polyamide nanocomposite molding compound produced according to one or more of Claims 1 through 11 for injection molding reflectors for vehicle driving illuminators.

18. A use of a polyamide nanocomposite molding compound produced according to one or more of Claims 1 through 11 for injection molding reflectors for signal or street lights and/or sub-reflectors for vehicle driving illuminators.

19. The use of a polyamide nanocomposite molding compound produced according to one or more of Claims 1 through 11, characterized in that the gas injection molding technique is used during injection molding.